Wholesale Pricing and Location of New Generation

Strip Mall Location During Active Military Operations

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Wholesale Pricing And Plant Location

- News from the front
- Pricing in distorted power markets
- Market Expectations
- Resource Choices

News From The Front

January 18th Stage 3 Emergency

- Total resources: 47,532
- Outages: 12,574
- Loads: 29,503
- Actual Reserves: 5,455

AC Intertie

- Lightly loaded
- No path 15 problems

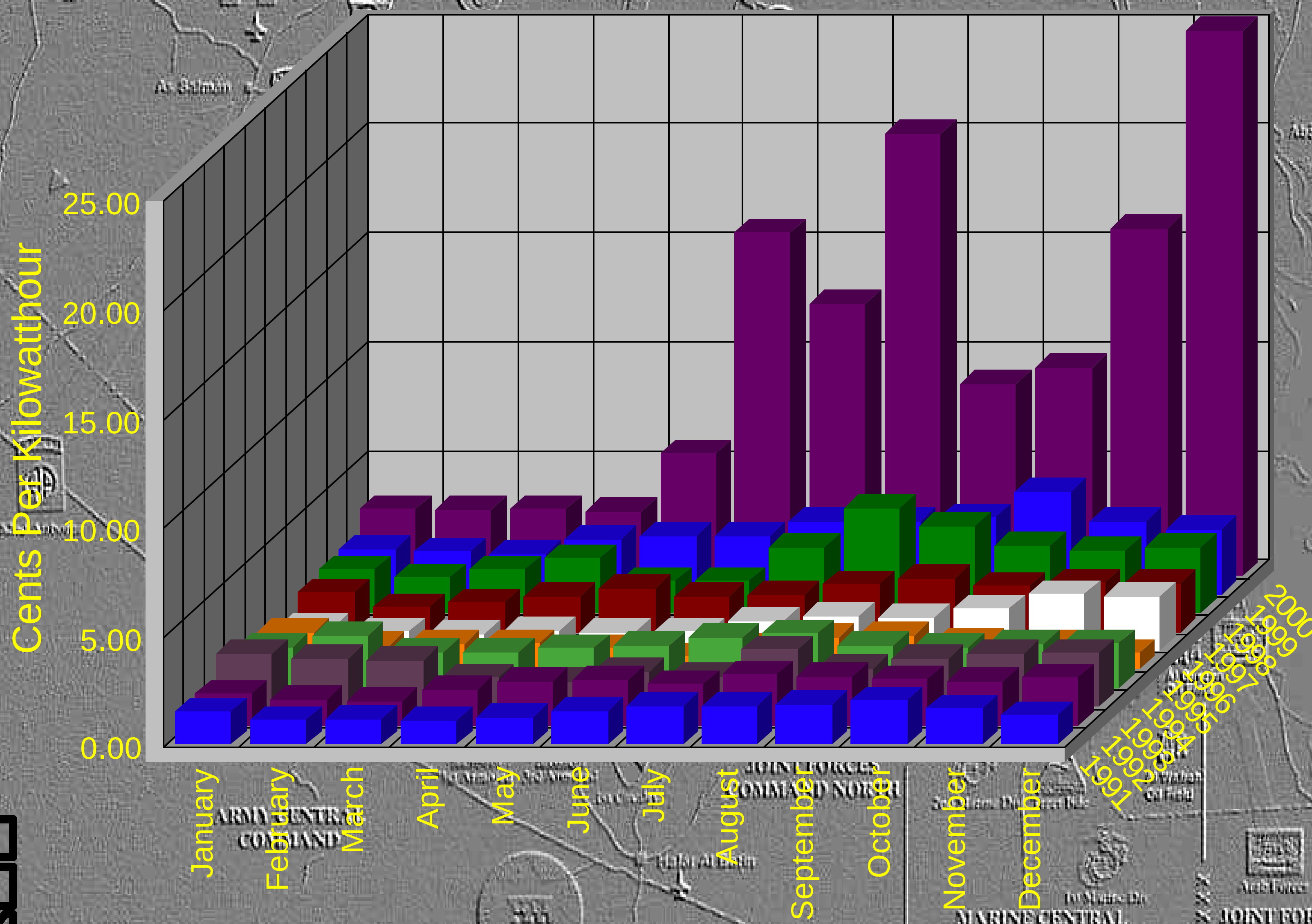
Pricing In Distorted Power Markets

- Prices Since May 22nd
- Market Power
- Governmental Intervention

Prices Since May 22nd

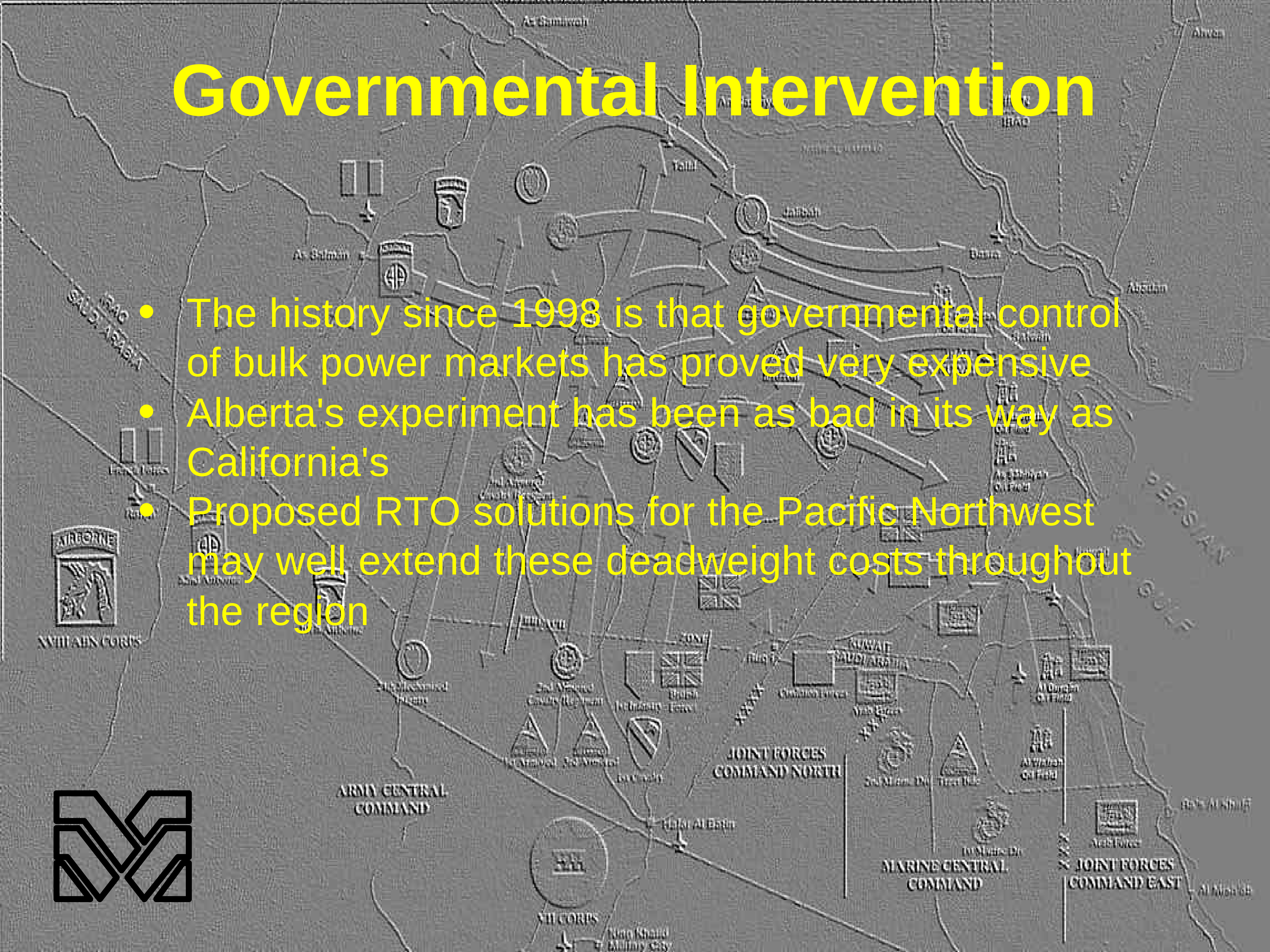
- In spite of 2000 being a dull year with lower peak loads in most regions and average water, wholesale prices reached the highest level in history
- While some of the problem was caused by governmental intervention in California -- particularly ISO market interventions, a major explanation is the market power exercised by a small number of California players
- After November 15th, high prices reflected the longest and largest set of plant outages in U.S. history

Twenty Years



Market Power

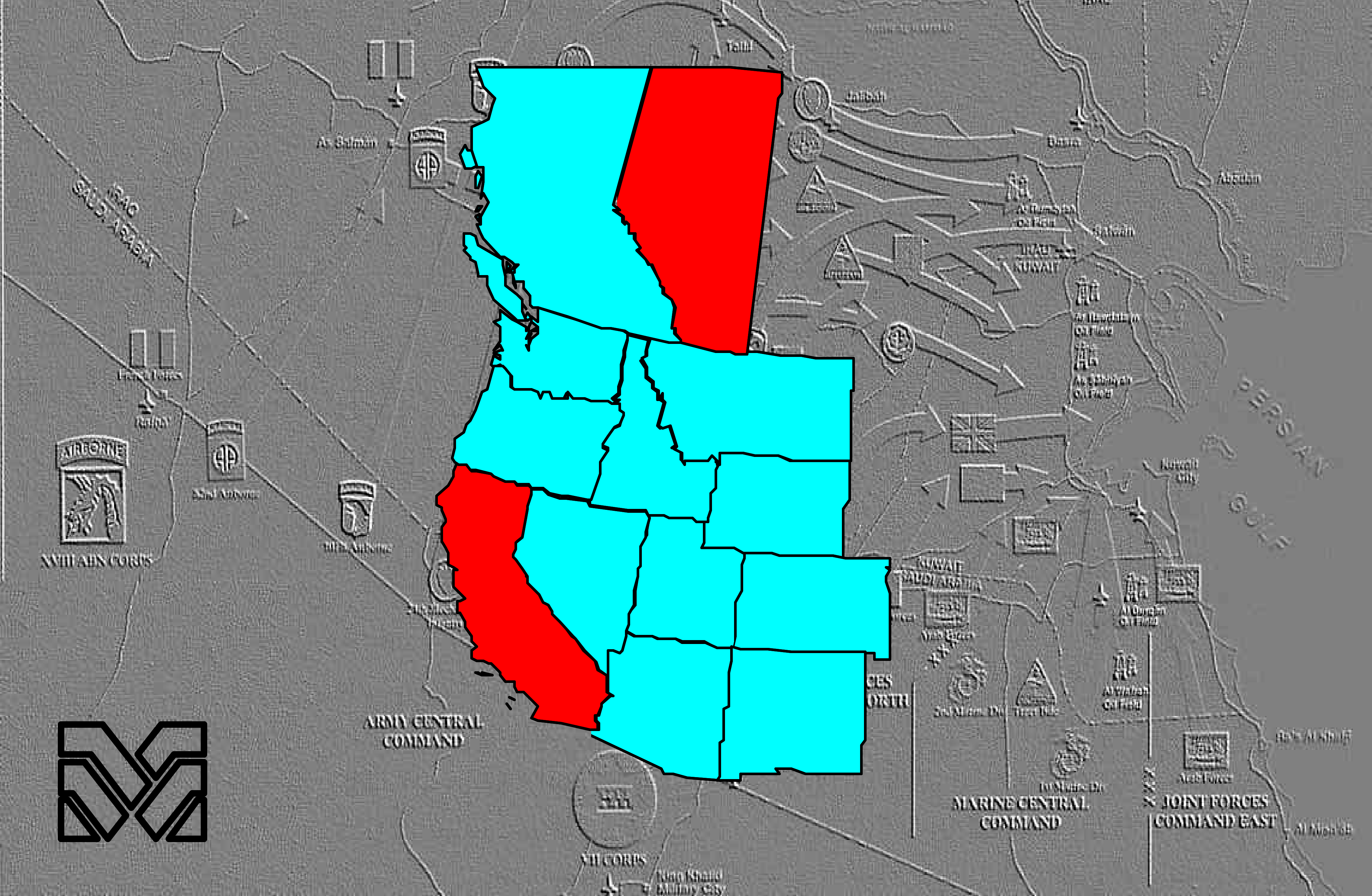
- A careful review of plant operation show a dramatic departure from traditional economic dispatch
- In 2000, dispatch rates of major California plants approximated 50% in spite of some of the highest energy prices in history
- Dispatch of plants in the SCAQMD was approximately the same as that outside SCAQMD



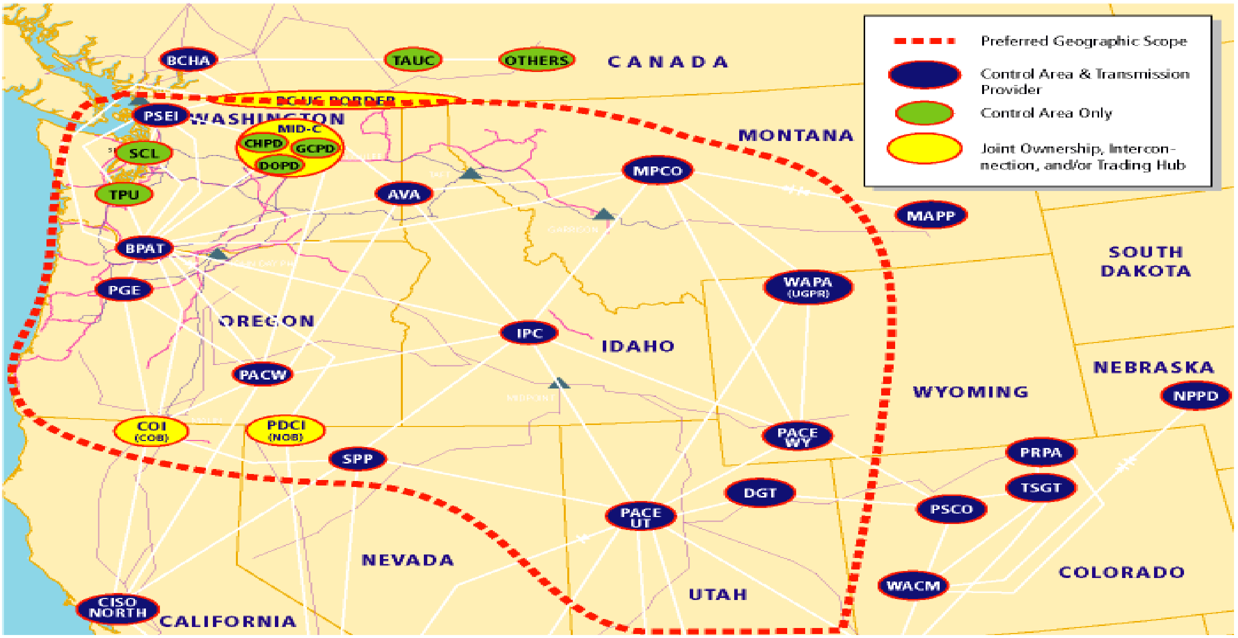
Governmental Intervention

- The history since 1998 is that governmental control of bulk power markets has proved very expensive
- Alberta's experiment has been as bad in its way as California's
- Proposed RTO solutions for the Pacific Northwest may well extend these deadweight costs throughout the region

Current Intervention



Northwest RTO



BCHA- British Columbia Hydro & Power Authority
TAUC- TransAlta Utilities Corporation
PSEI- Puget Sound Energy
Mid-C- Mid-Columbia Utilities
CHPD - Chelan County PUD
GCPD - Grant County PUD
DOPD - Douglas County PUD
SCL- Seattle City Light
TPU- Tacoma Power
BPAT- Bonneville Power Administration, Transmission Business Line
PGE- Portland General Electric
PACW- PacifiCorp West
COI- California-Oregon Intertie (or, Alternating-Current Intertie)
COB- California-Oregon Border
NOB- Nevada-Oregon Border
PDCI- Pacific Direct
PGE- Portland General Electric

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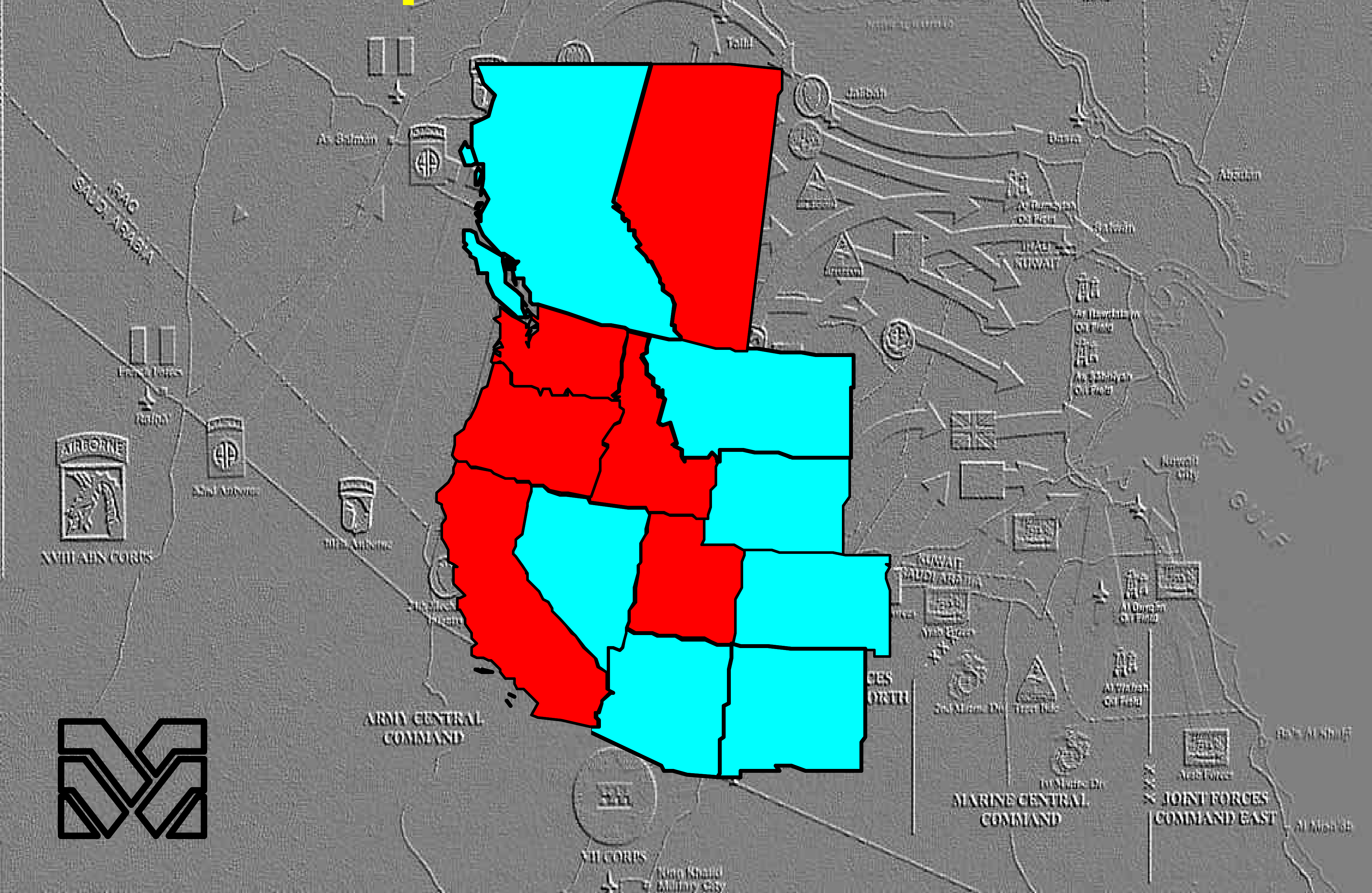
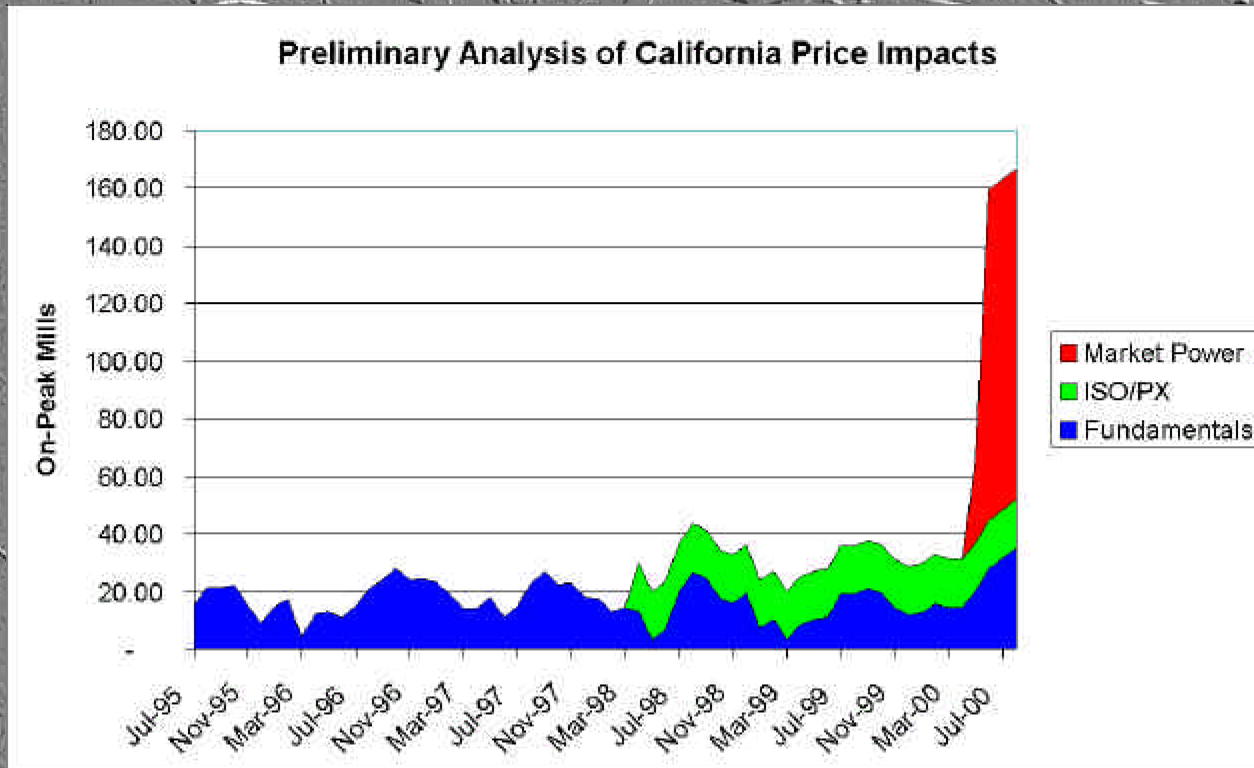
AVA- Avista Corp.
MPCO- Montana Power Company
WAPA- Western Area Power Administration
IPC- Idaho Power Company
PACE/WY- PacifiCorp East in Wyoming
PACE/UT- PacifiCorp East in Utah
DGT- Deseret Generating & Transmission Cooperative
MAPP- Mid-Continent Area Power Pool
PSCO- Public Service Colorado
PRPA- Platte River Power Authority
TSGT- Tri-State Generation & Transmission Association, Inc.
WACM- West Plains Energy

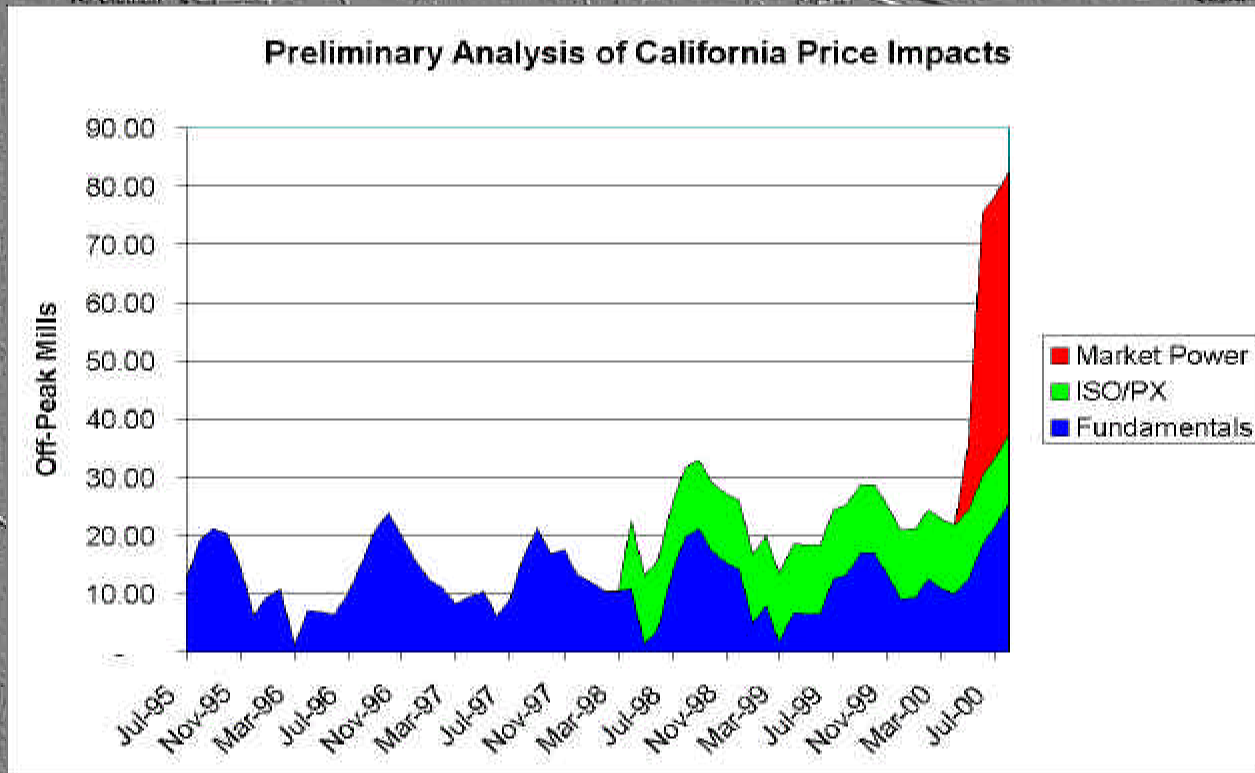
Proposed Intervention



On-Peak Price Impacts



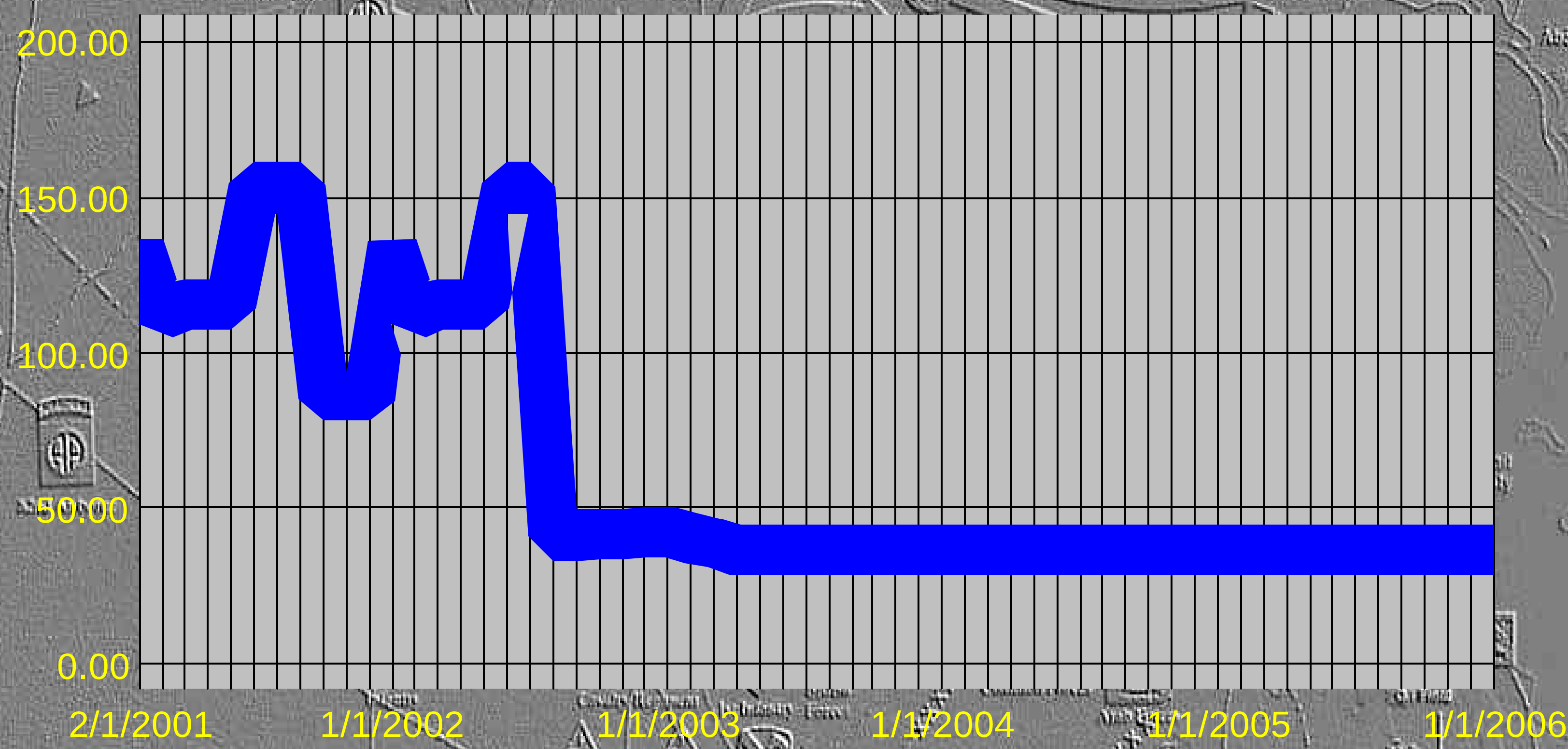
Off-Peak Price Impacts



Market Expectations

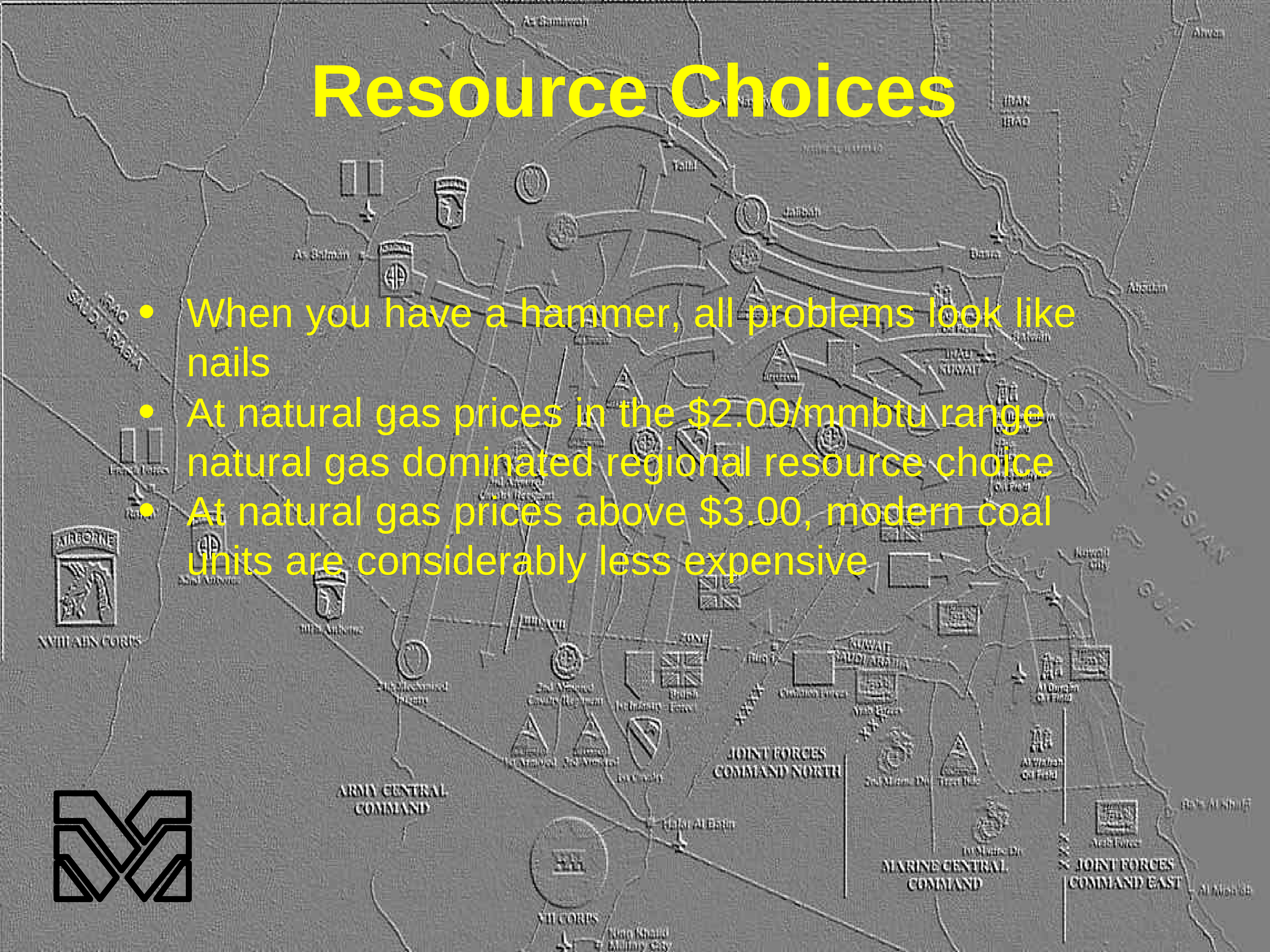
- "Future curves" are confused at best
- Most market participants predict prices reflecting short term distortions and long term natural gas prices
- While simple, these forecasts are hardly reassuring or very authoritative

Future Curves



Resource Choices

- When you have a hammer, all problems look like nails
- At natural gas prices in the $2.00/mmbtu range natural gas dominated regional resource choice
- At natural gas prices above $3.00, modern coal units are considerably less expensive



Resource Screening Curve

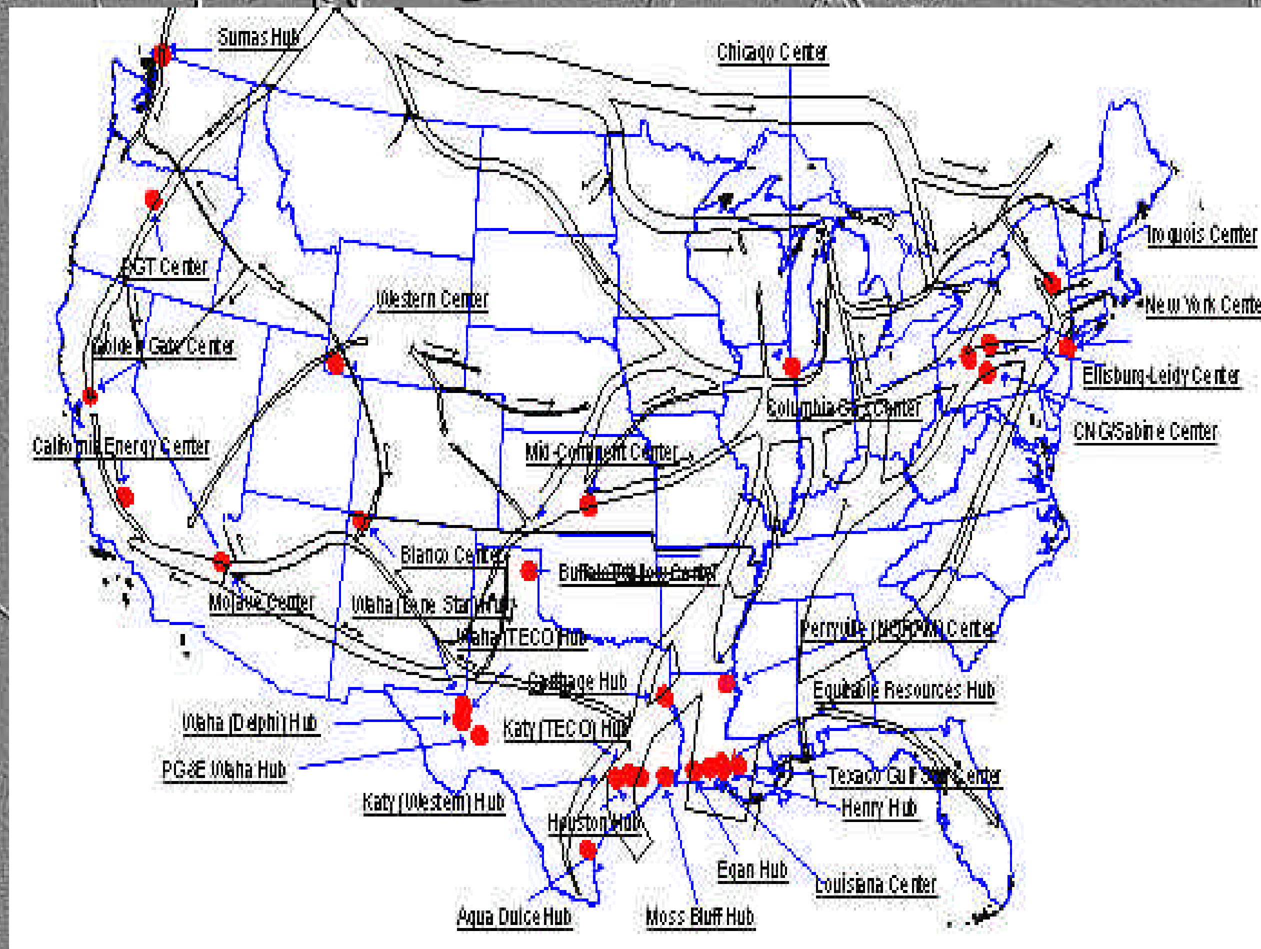
Coal Technologies

	Pulverized Coal Steam-Electric	Atmospheric Fluid-Bed Steam-electric Power Plant	Coal Gasifier Combined-cycle Power Plant	Pressurized Fluid-Bed Combined-cycle Power Plant
Configuration	1x300	1x200, circulating bed	1x540, Destec process	1x340, bubbling bed, supercritical
Status	Mature commercial	Mature commercial	Early commercial	Demonstration
Typical Application	Bulk power supply	Bulk power supply	Bulk power supply	Bulk power supply
Unit Capacity (MW)	300	200	540	340
Availability (%)	85%	90%	86%	81%
Heat Rate (Btu/kWh)	10,070	10,290	8,490	8,510
Overnight Cost ($/kW)	$1,650	$1,930	$1,480	$1,340
Fixed Operating Cost ($/kW/yr)	$48	$39	$15	$39
Variable Operating Cost (mills/kWh)[3]	1.1	1.3	5.4	1.0
Development & Construction Lead Time (Months)	48/36	48/36	36/38	36/36
Cash Flow (%/yr)	1/1/1/2/25/45/25	1/1/1/2/25/44/25	1/1/2/25/45/25	1/1/2/25/45/25
Service Life (Years)	40	40	30	30
Comparative Levelized Energy Cost (cents/kWh)[4]	4.4	4.7	3.9	3.5

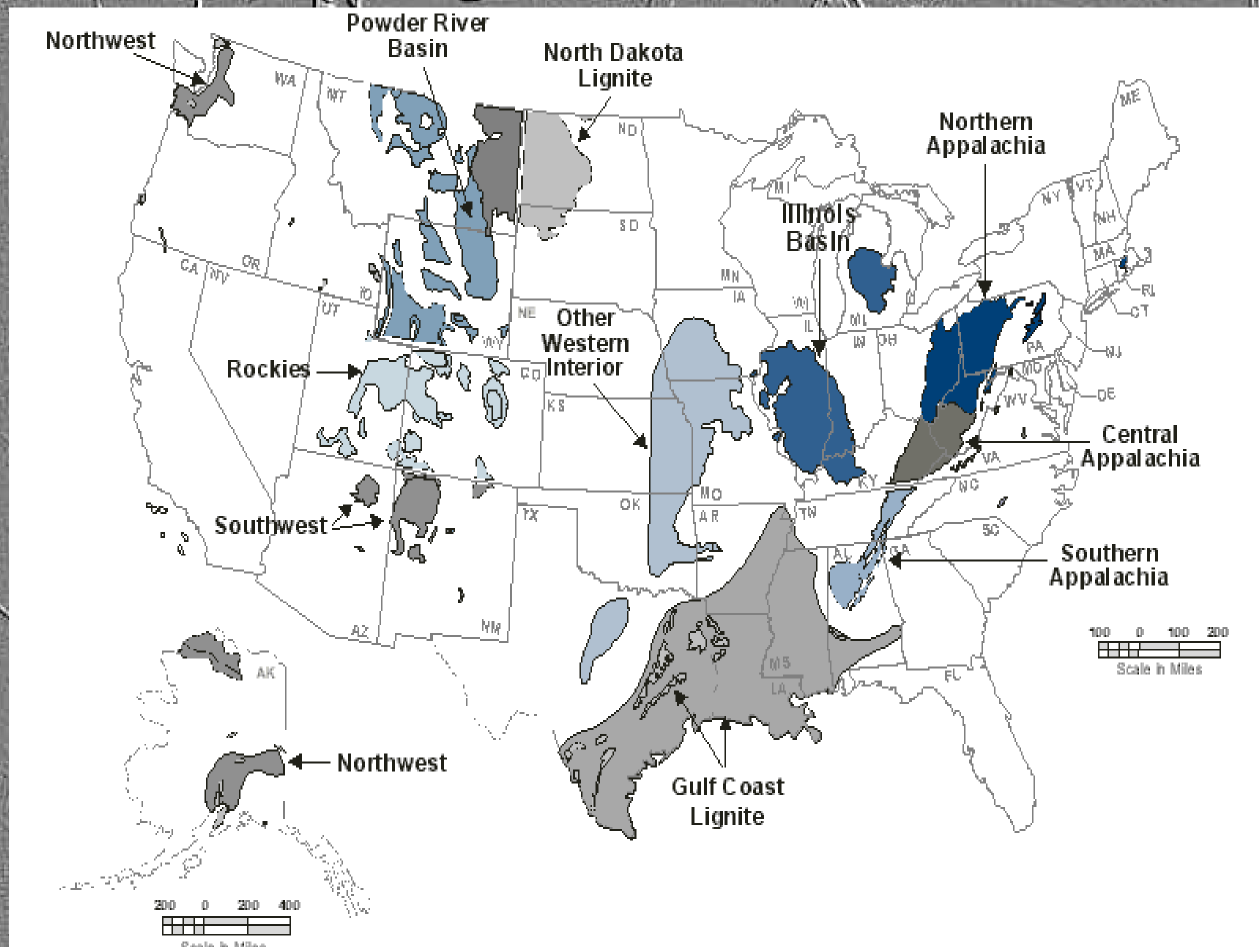
Pacific Northwest Geography

- Natural gas plant locations tend to follow pipelines
- Coal unit locations tend to follow rail
- Given the path of current natural gas prices developers will begin to study maps of railways rather than gas pipelines

Natural Gas Geography



Coal Geography



Parting Shots

- With the pressure on to replace markets with centralized solutions, we can expect increased volatility and inefficiency
- Plant selection should favor baseload
- At current prices coal is less expensive than gas
- Locations shift east with coal -- towards Montana